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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/789,500	02/27/2004	Evan George Colgan	YOR920030527US1 (8728-665)	9091
46069 7590 01/12/2007 F. CHAU & ASSOCIATES, LLC 130 WOODBURY ROAD WOODBURY, NY 11797			EXAMINER MITCHELL, JAMES M	
			ART UNIT	PAPER NUMBER
			2813	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/12/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/789,500	COLGAN ET AL.	
	Examiner	Art Unit	
	James M. Mitchell	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 October 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 and 30-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-21 is/are allowed.
- 6) ☒ Claim(s) 22-28 and 30-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This office action is in response to applicant's remarks filed October 23, 2006.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 22-28 and 30-32 are rejected under 35 U.S.C. 102(b) as being anticipated by Horvath et al. (U.S. 5,052,481).

Horvath (Fig. 3A, 3D) discloses:

(cl. 22, 23, 26) a semiconductor package, comprising: a semiconductor chip/ and or plurality of chips (11; Fig. 3A) having a plurality of first thermal fins (14, 15) on a portion of a non-active surface of the semiconductor chip, wherein the first thermal fins longitudinally extend across the portion of the non-active surface of the semiconductor chip; a heat conducting device having a plurality of second thermal fins (e.g. 43) on a portion of a mating surface of the heat conducting device, wherein the second thermal fins longitudinally extend across the portion of the mating surface of the heat conducting device; and a thermal joint formed between the non-active surface of the semiconductor chip and the mating surface of the heat conducting device, wherein the thermal joint comprises a band of interdigitated thermal fins (e.g. 14, 43) comprising the first and second thermal fins mated together and thermally coupled using a rigid bonding material or a compliant thermally conductive material ("oil", Col. 15, Lines 47-50;

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Abstract) wherein the thermal joint further comprises a complaint thermal conductive material (29) formed between planar portions of the non-active surface of the semiconductor chip and the mating surface of the heat conducting device (Fig. 3D); (cont. cl.22) wherein longitudinally extending interdigitated fin are oriented to extend in a direction that passes through a neutral stress point of the semiconductor (e.g. fin of case 40 above item, 36, extends downward forming a vertical plane that passes middle of chip, 11; Fig. 3A); (cl. 24, 27) wherein the heat conducting device is a package lid, a package cap, a heat sink, a cooling plate, or a thermal hat (40). (cl. 25, 28) heat conducting members is copper (Col. 10, Lines 33-35); (cl. 30, 31) where thermal material between interdigitated fins and between the planar portion of non-active surface of chip (e.g. back surface of chip are formed of same material ("some times"; Col. 11, Lines 22-27); (cl. 32) fins pass through hot spots of the semiconductor package (e.g. vertical planes extending along top /bottom fins pass over all area of chip and therefore includes a hot spot¹).

Allowable Subject Matter

Claims 1-21 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: the prior art does not disclose or make obvious the gap between interdigitated

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fins that is filled with a compliant layer varying across a thermal joint including all the limitations of the independent claim².

Response to Arguments

Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James M. Mitchell whose telephone number is (571) 272-1931. The examiner can normally be reached on M-F 8:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

¹ Understood to be the region of chip with the highest power density region (see PG PUB 2005/018958 Par. 0075)

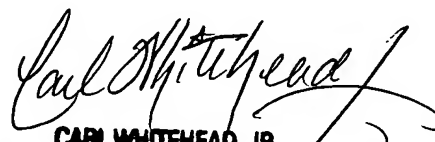
² Criticality has been established by applicant (see PG PUB 2005/018958, Par. 0057) whereby relief of thermal mismatch in a direction perpendicular to the fins is in part a result of varying the gap size

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Ex. Mitchell, J.D.
January 6, 2007



CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800